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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/080,555 | 02/25/2002 | Vincenzo Arcella | 108910-00054 | 8227 |
| 7590 | 08/24/2004 | | EXAMINER | |
| ARENT FOX KINTNER PLOTKIN & KAHN, PLLC Suite 600 1050 Connecticut Avenue, N.W. Washington, DC 20036-5339 | | | BELL, BRUCE F | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1746 | |

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|-----------------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/080,555 | ARCELLA ET AL. <i>OB</i> |
| | Examiner | Art Unit |
| | Bruce F. Bell | 1746 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 20-24 is/are allowed.
- 6) Claim(s) 1,2,4-9 and 12-19 is/are rejected.
- 7) Claim(s) 3,10 and 11 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 - Certified copies of the priority documents have been received in Application No. _____.
 - Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>06/06/02</u> . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Specification

The following guidelines illustrate the preferred section headings to be used before each section in the specification of a utility application.

Applicant is requested to place the section headings below before each section in their instant specification:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT (if applicable).
- (d) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
- (e) BRIEF SUMMARY OF THE INVENTION.
- (f) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (g) DETAILED DESCRIPTION OF THE INVENTION.
- (h) CLAIM OR CLAIMS (commencing on a separate sheet).
- (i) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

Claim Rejections - 35 USC § 101

Claims 17-19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. “**USE**” claims are considered a non-statutory class of invention. Applicant’s claims should be directed to either an apparatus or a method.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4-9, 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al (6146747) in combination with Stengaard (5091086), Moya (6179,132) and Kidd (WO 00/61267).

Wang et al disclose a polymeric membrane that is cast from a polyvinylidene difluoride (pvdf) polymer solution and is useful in micro-filtration and ultra-thin applications. See abstract. A microporous PVDF polymer membrane having a microporous surface with minimum pores and an opposite surface with maximum pores. The membrane also contains up to about 30% by weight polyvinylpyrrolidone (PVP). See col. 5, lines 53-65. The PVDF membrane is rendered hydrophilic by contacting it with a wetting agent or surfactant and has a microporous surface with minimum pores. See col. 6, lines 2-7 and 31-33. The PVDF membrane is cast by providing 12-20% PVDF and 1-30% of a hydrophilic polymer such as PVP dissolved in solvent to form the film on a porous support. See col. 6, lines 39-51.

Wang et al does not disclose the water permeability of higher than 1 l/m²h.atm. or that the ionomer is of amorphous form. And having a hydrophilic group in the acid form.

Stengaard discloses a process for preparation of membranes by means of treating a permeable, porous polymeric membrane of hydrophobic character with a solution of an NH or OH containing compound in the presence of a cross-linking agent, surfactant or initiator followed by rendering the layer deposited during treatment insoluble on the membrane surface by means of a catalyst reaction in order to affix the hydrophilic material to the membrane. See abstract and col. 4, lines 5-18. The PVDF

membrane has added into it a chlorotrifluoroethylene/vinylidene copolymer in a solvent along with swelling agents/non-solvents and viscosity increasing components. See col. 3, lines 1-13. The membrane of the patented invention is shown to be treated in the presence of a common inorganic base of NaOH or a sulfuric acid, as a catalyst. See col. 5, lines 56-60 and col. 6, lines 21-26. A cross-linking agent may also be used. See col. 6, line 1-20. The water permeability of a membrane made as set forth above is shown at col. 9, lines 21-38 and is greater than 1 l/m²h.atm.

Moya disclose porous membranes formed on a porous polyperfluorocarbon membrane substrate having its surface modified, wherein the modified surface is directly wet with an aqueous liquid. See abstract. Moya discloses that the perfluorocarbon polymer composition is of at least two monomers with one of the monomers being a vinyl fluoride, vinylidene fluoride, trifluoroethylene, chlorotrifluoroethylene, perfluoroalkylvinyl ether or tetrafluoroethylene. See col. 7, lines 47-54. The second monomer is selected from a group of fluorine containing monomers having a hydrophilic functional group. See col. 7, lines 55-67. The second monomers are generically represented by the formula $\text{CF}_2=\text{CFR}_f\text{X}$, wherein R_f is a linear or branched bifunctional perfluorinated radical having one to 8 carbon atoms. See col. 8, lines 1-4. The second monomers can have the structures as shown at col. 8, line 45 – col. 10, line 33.

Kidd et al disclose integral porous membranes having an amorphous fluoropolymer which is a copolymer of TFE and perfluoro-2,2-dimethyl-1,3-dioxole. See abstract. The membrane is prepared on a porous or non-porous support using an

amorphous fluoropolymer having a low degree of crystallinity of less than 30%, preferably less than 20%, more preferably less than 10% and most preferably about 0%. See page 3, lines 3-13. Monomers used for making the membrane are tetrafluoroethylene, vinylidene fluoride, hexafluoropropylene, chlorotrifluoroethylene and fluorinated functional monomers like perfluoroalkylvinyl ethers, perfluoroesters, perfluorosulfonylfluorides, and perfluorodioxoles. See page 3, line 27 – page 4, line 9. The substrate being used as the support for the membrane is disclosed as being a glass plate or PTFE sheet. See page 7, line 20-21. The substrate or support may be porous or non-porous, hydrophilic or hydrophobic and the preferred support is PTFE. See page 8, lines 11-16.

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because even though the prior art of Wang et al is silent to the water permeability, the ionomer being amorphous and the hydrophilic group being in acid form, the prior arts of Stengaard, Moya and Kidd show that these aspects are known in the art to be used in conjunction with the making of a porous hydrophilic membrane. The prior art of Wang et al shows that it is known to one having ordinary skill in the art that when a CTFE/VF is used in the making of a PVDF membrane that the water permeability will be in the range as set forth in the applicant's instant claims when a hydrophobic solution using OH is used in the presence of a cross-linking agent, surfactant or initiator to render the membrane surface insoluble, so that it affixes the hydrophilic material to the membrane. Therefore, it would be within the ability of the person having ordinary skill in the art to use this aspect of making the membrane

hydrophilic in the membrane of Wang et al instead of the materials used to make the Wang et al membrane hydrophilic in order to achieve a water permeability that is greater than 1 l/m²h.atm.

With respect to claims 2 and 4, the prior art of Wang shows that the ionomer is less than about 20% and that the membrane has a microporous surface with minimum pores.

With respect to claim 5, perfluoropolymers, and PTFE are taught to be basic supports used in making membranes as shown in all of the cited patents.

With respect to claim 6-9, Moya et al discloses that these fluorinated monomers are known to be used make the membranes hydrophilic in nature.

With respect to claim 12 and 13, Kidd discloses that it is known to make porous membranes amorphous by combining TFE and a dioxole specifically but generally discloses that any suitable combination of halogenated monomers can be used to form the amorphous copolymer, and further shows that copolymers made in this manner have a low degree of crystallinity.

With respect to claim 14, Stengaard discloses that in the method of making a porous polymeric membrane having a hydrophilic surface layer, it is known to make the membrane by optionally using a cross-linking agent.

With respect to claim 15, Stengaard and Moya et al both disclose that one or more fluoropolymers may be used to make the membrane amorphous.

With respect to claim 16, Kidd et al disclose that amorphous fluoropolymers of the crystalline type are used in making porous membranes as long as the crystallinity is less than 30%.

Therefore, one having ordinary skill in the art at the time the instant invention was had the ability to use the above concepts as shown in the patents to Stengaard, Moya and Kidd in the microporous PVDF membrane of Wang to yield a membrane having the characteristics as set forth in applicant's instant claims as set forth.

Allowable Subject Matter

3. Claims 3, 10, 11, 20-24 are allowable over the prior art of record.
4. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach and/or suggest the ionomer being present in an amount greater than 30% and further does not disclose the bis-olefin in the membranes composition. The process of making the membrane wherein the membrane is treated in a strong alkali and then treated in a strong acid is also not taught or suggested.
5. Claims 3, 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce F. Bell whose telephone number is 571-272-1296. The examiner can normally be reached on Monday-Friday 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BFB
August 20, 2004


Bruce F. Bell
Primary Examiner
Art Unit 1746